



# Fact Sheet

## *on the draft Major Source Permit for Ridgewood Rhode Island Generation*

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### **Introduction**

The Department of Environmental Management, Office of Air Resources has received an application from Ridgewood Rhode Island Generation, LLC to install four, landfill gas-fired engine-generator sets at its existing facility in the town of Johnston. The Office of Air Resources has reviewed the application for compliance with the applicable state and federal air pollution control regulations. A draft Major Source Permit for public review and comment has been prepared. This fact sheet will describe the facility, important aspects of the application and draft permit and the process for public comment.

### **Description of the Proposed Facility**

The proposed project will consist of four Caterpillar G3520C engine-generator sets. Each engine-generator set consists of a 2229 horsepower (HP) lean burn, spark ignited internal combustion engine and a 1600 kilowatt (kWe) generator. Each engine is equipped with air/fuel ratio controllers and intercoolers. The total landfill gas consumption rate for each engine is approximately 500 standard cubic feet per minute (scfm).

The existing facility consists of nine Waukesha and two Deutz landfill gas fired engine-generator sets. The Waukesha engine-generator sets each consist of a 2400 HP engine and a 1700 kWe generator. Each Waukesha engine consumes approximately 567 scfm of landfill gas when operating at maximum capacity. The Deutz engine-generator sets each consist of a 1735 HP engine and a 1255 kWe generator. Each Deutz engine consumes approximately 410 scfm of landfill gas when operating at maximum capacity. There is also a 400 HP Detroit Diesel emergency generator at the facility.

The facility is located within the property of the Central Landfill, 65 Shun Pike, Johnston. The Central Landfill, owned and operated by the Rhode Island Resource Recovery Corporation, is an integrated solid waste management facility located on a site comprising approximately 1100 acres. The primary solid waste management activity at the site is the operation of a municipal solid waste landfill.

A large quantity of landfill gas is generated at the Central Landfill from the anaerobic decomposition of the municipal solid waste after the waste is buried. Landfill gas generation can begin about six months after the waste is buried and can continue being generated for up to 20 years. The landfill gas is collected in a system of vertical extraction wells and horizontal collection trenches and then piped to the Ridgewood facility. Flares control any excess landfill gas that is not used by Ridgewood.

The landfill gas is treated prior to combustion. The gas treatment system filters, dewateres and compresses the landfill gas. This gas treatment system is subject to federal requirements (see 40 CFR 60.752(b)(2)(iii)(C)) and meets those requirements.

### **Emission Limitations**

The emission limitation for nitrogen oxides must be considered the lowest achievable emission rate (LAER) because Rhode Island is a nonattainment area for ozone and the potential increase in allowable nitrogen oxides emissions is greater than 25 tons per year.

LAER is the most stringent emission limitation derived from either of the following:

- (1) the most stringent emission limitation contained in the implementation plan of any State for such class or category of source; or
- (2) the most stringent emission limitation achieved in practice by such class or category of source.

By definition LAER can not be less stringent than any applicable new source performance standard (NSPS).

The Office of Air Resources has determined that a nitrogen oxides emission limitation of 0.5 grams per brakehorsepower-hour (gr/bhp-hr) represents LAER. This determination is based on a review of recently issued permits by state and local air pollution control agencies for landfill gas-fired engine projects and a review of state and local air pollution control rules and regulations for landfill gas-fired engines

The emission limitations for carbon monoxide, particulate matter less than 10 microns (PM-10) and nonmethane hydrocarbons must be considered the best available control technology (BACT) because:

- For carbon monoxide and PM-10, the location is an attainment area for these pollutants and there would be a net increase in the emission of these pollutants.
- For nonmethane hydrocarbons (also known as volatile organic compounds (VOC)), Rhode Island is a nonattainment area for ozone and the potential increase in allowable nonmethane hydrocarbon emissions is less than 25 tons per year.

Best available control technology is defined as "an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each air pollutant which would be emitted from any proposed stationary source or modification which the Director, on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant.

The Office of Air Resources has determined that the following emission limitations represent BACT.

Carbon monoxide:	3.0 gr/bhp-hr
PM-10:	0.10 gr/bhp-hr
Nonmethane hydrocarbons:	20 ppmv, on a dry basis, corrected to 3% O <sub>2</sub>

These determinations are based on a review of recently issued permits by state and local air pollution control agencies for landfill gas-fired engine projects, a review of state and local air pollution control rules and regulations for landfill gas-fired engines and various post combustion control technologies.

### **Type and Quantity of Pollutants Emitted**

Table 1 lists the pollutants that are expected to be emitted from the proposed modification and the potential annual emissions. The hourly emission rates used in Table 1 are those contained in the draft permit. The tons per year and pounds per year values assume each engine operates for an entire year (8760 hours).

TABLE 1  
Pollutants and Potential Emissions

Pollutant	lbs/hr/engine	tons/yr
Nitrogen oxides	2.46	43.0
Carbon monoxide	14.74	258.3
PM-10	0.49	8.6
Nonmethane hydrocarbons	0.76	13.4
Sulfur dioxide	0.63	11.0
		Lbs/yr
Benzene	7.5 E-05	2.63
1,4-Dichlorobenzene	1.25 E-04	4.38
Hydrogen chloride	3.74 E-02	1310.5
Hydrogen sulfide	7.53 E-03	262.8
Mercury	5.0 E-06	0.18
Tetrachloroethene	1.25 E-04	4.38

### Air Quality Impacts

The applicant conducted air quality modeling to predict the impact on air quality from the proposed modification. The Office of Air Resources reviewed the modeling and agrees with the modeling results. The modeling demonstrated that the maximum predicted impacts for the proposed facility will not cause or contribute to air pollution in violation of the National Ambient Air Quality Standards (NAAQS). Table 2 is a summary of the maximum predicted impacts of the facility added to the existing background concentration and compared to the NAAQS.

TABLE 2  
Maximum Predicted Impacts of  
Criteria Pollutants and Comparison to NAAQS  
(micrograms per cubic meter) ( $\mu\text{g}/\text{m}^3$ )

Pollutant	Averaging Time	Maximum Predicted Impact ( $\mu\text{g}/\text{m}^3$ )	Background Concentration ( $\mu\text{g}/\text{m}^3$ )	Total Concentration ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	3-hour	80	172	252	1300
	24-hour	26	85	111	365
	Annual	5.43	21	27	80
CO	1-hour	1424	10,409	11,833	40,000
	8-hour	1068	4511	5579	10,000
NO <sub>2</sub>	Annual	8.55	46	54	100
PM-10	24-hour	23	91	114	150
	Annual	3.41	39	42	50

Air quality modeling conducted by the applicant in support of its application demonstrated that the maximum predicted impacts for the proposed facility will not cause or contribute to air pollution in violation of the allowable Prevention of Significant Deterioration (PSD) increments for criteria pollutants. PSD increments limit the degree to which air quality in an area can be degraded from new or modified air pollution sources. Table 3 is a summary of the maximum predicted impacts of the proposed facility and all other new or modified sources in the area in comparison to PSD increments.

TABLE 3  
Maximum Predicted Impacts of  
Criteria Pollutants and Comparison to PSD Increments ( $\mu\text{g}/\text{m}^3$ )

Pollutant	Averaging Time	Maximum Predicted Impact All Existing Sources ( $\mu\text{g}/\text{m}^3$ )	Full PSD Increment ( $\mu\text{g}/\text{m}^3$ )
SO <sub>2</sub>	3-hour	80	512
	24-hour	26	91
	Annual	5.43	20
NO <sub>2</sub>	Annual	8.55	25
PM-10	24-hour	23	30
	Annual	3.41	17

The proposed project is a major modification for the pollutant nitrogen oxides. Subsection 9.5.3(a) of Air Pollution Control Regulation No. 9 limits increment consumption for major modifications to 25% of the remaining annual increment. Table 4 is a summary of the maximum predicted impacts of nitrogen oxides for the proposed facility in comparison to the allowable remaining PSD increment.

TABLE 4  
Maximum Predicted Impacts of Nitrogen Oxides and  
Comparison to Allowable Remaining PSD Increments ( $\mu\text{g}/\text{m}^3$ )

Pollutant	Averaging Time	Maximum Predicted Impact All Existing Sources ( $\mu\text{g}/\text{m}^3$ )	Full PSD Increment ( $\mu\text{g}/\text{m}^3$ )	Maximum Predicted Impact from Modification ( $\mu\text{g}/\text{m}^3$ )	Allowable Remaining PSD Increment ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	Annual	8.27	25	3.37	4.18

Air quality modeling conducted by the applicant in support of its application demonstrated that the maximum predicted impacts due to the proposed modification combined with other emission sources at Ridgewood and the Central Landfill, for the pollutants, 1,4-dichlorobenzene, benzene, hydrogen sulfide, hydrogen chloride, mercury and tetrachloroethylene, are below acceptable ambient levels set in Air Pollution Control Regulation No. 22 "Air Toxics". The maximum predicted impacts of these pollutants are summarized in Table 5 and compared to acceptable ambient levels.

TABLE 5  
Maximum Predicted Impacts of  
Listed Toxic Air Contaminants and Comparison to Acceptable Ambient Levels ( $\mu\text{g}/\text{m}^3$ )

Pollutant	Averaging Time	Maximum Predicted Source Impact ( $\mu\text{g}/\text{m}^3$ )	Acceptable Ambient Level ( $\mu\text{g}/\text{m}^3$ )
1,4 -Dichlorobenzene	1-hour	0.109	5000
	24-hour	0.024	800
	Annual	0.003	0.09
Benzene	1-hour	0.064	200
	24-hour	0.014	30
	Annual	0.002	0.1
Hydrogen sulfide	1-hour	6.384	40
	Annual	0.205	10
Tetrachloroethylene	1-hour	0.097	1000
	Annual	0.003	0.2
Mercury	1-hour	0.0004	2
	24-hour	0.00012	0.3
	Annual	0.00002	0.009
Hydrogen Chloride	1-hour	5.619	2000
	Annual	0.144	9

### **Emissions Offsets**

Subsection 9.4.2 (c) of Air Pollution Control Regulation No. 9 requires the applicant to offset the annual emissions of nitrogen oxides allowed from the proposed new modification with emissions reductions from this facility or another facility. The new emissions must be offset with reductions at a ratio of 1.2:1. The offset requirement is 52 tons of NO<sub>x</sub> emissions (43 tons x 1.2 = 52 tons).

Ridgewood Rhode Island Generation has entered into a purchase agreement for 52 tons of NO<sub>x</sub> offsets to satisfy this requirement. These offsets were generated by the Medical Area Total Energy Plant in Boston, MA.

### **Public Participation/Public Hearing**

A public hearing on the draft permit will be held in Room 300 at the Rhode Island Department of Environmental Management's offices, 235 Promenade Street, Providence, Rhode Island on 2 December 2004 at 7:00 PM.

Members of the public are invited to make oral comments at the hearing. Members of the public may also mail or e-mail written comments to the Office of Air Resources. Written comments may be sent anytime during the public comment period which began on 2 November 2004. Written comments must be received by the Office of Air Resources no later than 4:00 PM, 2 December 2004, at which time the public comment period will close unless extended by the Hearing Officer. The mailing address for comments is:

Douglas McVay, Associate Supervising Engineer  
Department of Environmental Management  
Office of Air Resources  
235 Promenade Street  
Providence, RI 02908-5767

The e-mail address for comments is: [doug.mcvay@dem.ri.gov](mailto:doug.mcvay@dem.ri.gov)

The draft Major Source Permit and supporting documentation may be viewed during normal business hours (8:30 AM to 4:00 PM) at the Office of Air Resources. A copy of the draft Major Source Permit, this fact sheet and the technical review document for the project are also available for viewing or downloading on the DEM website ([www.state.ri.us/dem](http://www.state.ri.us/dem)).

#### **Contact Person**

For a copy of the draft Major Source Permit or for more information concerning the project contact Douglas McVay at 401-222-2808 (toll free 1-800-752-8088, TDD 401-831-5508).